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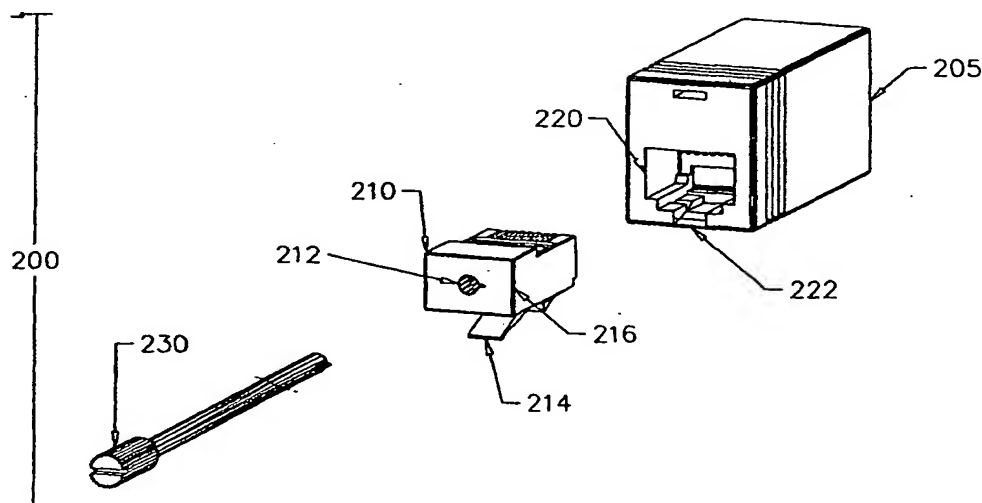
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(54) Title: COMMUNICATIONS JACK PROTECTOR



(57) Abstract: A locking plug (210) is used to protect a communication jack (220). The plug (210) has both a key-receiving member (212) and a locking member (214). The key-receiving member (212) range from something as simple as a hole, slot, or other physical opening, to a pad for a fingerprint sensor, or a data activated switch. By attaching a cable or other device to the plug (210), a computer may also be protected from unauthorized removal.

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## COMMUNICATIONS JACK PROTECTOR

### Field of The Invention

The field of the invention is electrical connectors.

### Background of The Invention

5           Electrical connectors generally comprise a female jack portion and a male plug portion. The jack portion necessarily includes a cavity, and that cavity is subject to becoming damaged or otherwise compromised.

10           It is known, for example, that small children sometimes insert metal objects into the opening of an electrical wall jack. Such behavior is not only potentially dangerous to the child, but may compromise the plug. In that instance the problem is readily resolved through the use of simple plastic insert plugs. The plugs protect the child because they do not conduct electricity, and they protect the jack by preventing insertion of inappropriate objects.

15           Although older children usually know enough not to electrocute themselves by sticking inappropriate electrically conducting objects into electrical jacks, they sometimes inset other materials into jacks just to be devilish. They may, for example, insert gum or paper into the holes of an electrical jack. This problem has been approached in many ways, including the use of screws or other connectors to firmly affix a proper plug to the jack. In some instances screws are utilized that require screwdrivers having a special head making removal more difficult.

20           It is also known to affix a cover over a jack. US Patent 4669281 to Young (June 1987), for example, teaches a plate that is mounted to a jack by screws. A cover is then locked to the plate so that the screws, and therefore the plate, cannot be removed.

25           Unfortunately, external locking devices such as that taught in '281 tend to be problematic due to their bulkiness and inconvenience. These problems are particularly acute with respect to communications jacks, such as RJ45 jacks utilized in connection with computer networks. Such jacks are often in such close proximity to each other that the locking device for one jack interferes with access to an adjacent jack. Additionally, many communications jacks do not have screws or screw holes for attachment of an external

locking device. Communications jacks also tend to be relatively small, easily plugged up with gum or other materials, and can be extremely difficult to clean out. Still further, they are typically made with plastic or other materials that are relatively fragile, and therefore easily damaged. Communications jacks may also be particularly subject to inappropriate use  
5 because they tend to carry only low voltage (21 Volts or less). The low voltage eliminates what might otherwise comprise a deterrent due to the possibility of sustaining an electrical shock.

All of these problems are apparent in schools, where the users tend to be immature, and where there are hundreds or even thousands of communications jacks. The jacks are also  
10 widely distributed, being disposed on computers, in the walls, tables, and even floors.

Thus, there is a need for improved devices and methods of protecting communications jacks.

### **Summary of the Invention**

Methods and apparatus are provided in which a locking plug is used to protect a  
15 communications jack. In preferred embodiments the plug has both a key-receiving member and a locking member.

The term "key-receiving portion" is used herein in a very broad sense. Key-receiving portions range from something as simple as a hole, slot, or other physical opening, to a pad for a fingerprint sensor, or a data activated switch. The key-receiving portion is most likely  
20 disposed on a front portion of the plug, although it may alternatively or additionally be disposed on a side, or even back portion of the plug. Magnetically operated plugs contemplated herein, for example, may operate through the bulk of the plug, to a magnetic latch on the back of the plug.

It is contemplated that locking plugs must be operated with some sort of key. The  
25 term "key", however, is interpreted very broadly, and includes mechanical, magnetic, and even data or other electronic keys. A suitable key may, for example, comprise a password or other code in data format that is carried electrically by the jack to the plug. Such keys may alternatively operate upon a radio receiver inside the plug, powered by current carried by the jack. The term "key" does have limits, however, and excludes mechanical members that are

permanently affixed to the plug. Thus, the manually operated, ordinary plastic catch or latch formed as part of a typical RJ45 plug does not constitute a key as that term is used in this application.

5 Locking members are contemplated to include all manner of posts, latches, and other suitable physical devices. A single plug may advantageously include two or more locking members.

Locking communications plugs contemplated herein can be adapted to all currently used communications plugs, as well as future developed plugs. Moreover, contemplated uses include stationary jacks such as those disposed in walls, floors, and desks, as well as used  
10 movable jacks, such as those disposed in portable computers, hand-held devices, and so forth. By attaching a cable or other device to the plug, a computer may also be protected from unauthorized removal.

Various objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of preferred embodiments of the  
15 invention, along with the accompanying drawings in which like numerals represent like components.

#### **Brief Description of The Drawings**

Figure 1 is a perspective view of a prior art jack protection system.

20 Figure 2 is a perspective view of a communications plug and a communications jack according to the present inventive subject matter.

Figure 3 is a perspective view of an alternative inventive communications plug, having a key-receiving slot.

Figure 4 is a perspective view of another alternative communications plug, having a plurality of locking members.

25 Figure 5 is an exploded perspective back view of a locking plug operated in conjunction with a computer.

### Detailed Description

In Figure 1 a prior art jack protection system 100 generally comprises a jack housing 120 supporting a jack 122, and a plug 116. The plug 116 is mated with the jack 122, and is then held in position using plate 110 and plate screws 112. A locking cover 130 is then  
5 coupled to the plate 110, and locked in place using key 132.

In Figure 2 a communications plug system 200 generally comprises a communications jack 220, and a communications plug 210 having a key-receiving portion 212, a locking mechanism (not shown), a locking member 214, and a key 230. Although a particular embodiment is depicted, the system is intended to be viewed in a generic manner,  
10 covering all possible electrically conducting communications interfaces, including RJ45, RS232, Ethernet, USB, and so on.

Communication plug 210 is sized and dimensioned to fit within the communications jack 220, and preferably fits snugly into the jack to minimize unauthorized access. It should be appreciated that plug 210 may be constructed of any suitable material, including metals  
15 and alloys, plastics, and composites. A preferred plug is constructed of a polycarbonate shell, with metal locking members and any other moving parts being constructed of metal or metal alloy to provide increased strength, and reduce sticking.

Key-receiving portion 212 functions in combination with the locking member(s) 214 to lock or unlock the plug 210. The key-receiving portion 212 may comprise a hole, a slot, a  
20 signal transceiver, an optical scanner, a magnet, or some other type of key receiver. A preferred key-receiving portion 212 is located on the face 216 of the plug 210, although it may be located anywhere on the plug 210 that does not disable its functionality.

In an embodiment where the key-receiving portion 212 includes a hole, the hole may be an irregularly shaped hole or regularly shaped hole, but in any event, the shape of the hole  
25 is preferred to be relatively unique so that common items cannot be used as a key. Once inserted into the key-receiving portion, a key may interact with tumblers that enable the key to be used appropriately to lock and unlock the plug.

In a class of embodiments, the key-receiving portion 212 may comprise or interact with a signal receiver that is capable of receiving a signal to lock or unlock the plug. The signal receiving capability is explained in more detail under Figure 5.

5 The key-receiving portion 212 may alternatively include or interact with an optical scanning device (not shown) that is capable of scanning a fingerprint. In such an embodiment, the scanner may verify the fingerprint, then either lock or unlock the plug. The scanner may alternatively scan other items that verify the authority to lock or unlock the plug. For example, the scanner device may read a bar code that represents an authorizing code. In another alternative embodiment, the key-receiving portion 212 uses a magnetic force to  
10 actuate the locking member(s).

Locking member 214 locks the plug 210 within the jack 220. Locking may be automatically engaged when the plug 210 is inserted, or locking may be dependent upon another action. The locking member 214 is preferably biased by manipulation of a key 230 within the key-receiving portion 212. The locking member 214 may be depressed while  
15 inserting the plug into the jack. The locking member snaps into its non-depressed position when it passes the lock receiving portion 222 of the jack 220. The combination of the lock receiving portion 222 and the locking member 214 are intended to deter removal of the plug 210.

All suitable types of locking members are contemplated. A preferred class of locking  
20 members is similar to the tab on a phone plug in that it remains in a locked position when no force is acting upon it. Here, however, the tab 214 would be locked in place using an internal mechanism (not shown), that would be released by inserting, and perhaps turning, a suitable key 230 into the key-receiving portion 212. Another class of locking members is similar to a "dead bolt" in that it can be in either the locked or the unlocked position. See, e.g., locking  
25 member 430 in figure 4. Yet another class of locking members is similar to a door latch (see e.g., latch 314 in Figure 3) in having a relatively elongated flat portion. It is contemplated that locking members can be biased by a spring or other mechanism in either the locked or unlocked positions.

Figure 3 depicts a plug 310 having a "V" shaped key-receiving portion 312, for use  
30 with a triangular shaped key (not shown). The slot may, of course, have some other cross-sectional shape, including rectangular or hemi-circular. In this instance the locking member

314 is latch shaped, although it should be appreciated that any key-receiving portion can conceivably be utilized with substantially any type of locking member.

Figure 4 depicts a plug 410 comprising a key-receiving portion 412, two locking members 414, and a body 430. The key-receiving portion 412 has a key-way shaped and dimensioned to accommodate a key (not shown) having a matingly shaped cross-section, and ridges that actuate miniature tumblers (not shown). The key is inserted into the key-receiving portion 412, and then turned to actuate the locking members 414. The locking members 414 are usually extended away from the body 430 of the plug 410 when in a locked position, and are withdrawn within the body 430 when in an unlocked position.

In Figure 5, an electronic locking system 500 for a computer 505 having communications jack 520 generally comprises a plug 510, and a chord 540. In this embodiment the plug 510 has a housing that comprises electronics (not shown) that are capable of receiving a signal to lock or unlock the locking members 514 of the plug 510.

The computer 505 may be any type of device capable of sending a lock/unlock signal. Computer 505 may, for example, comprise a laptop or desktop computer, a PDA, or a cell phone. The signal is preferably sent via whatever electronics and path is normally used to send a signal through the communication jack 520. The signal then preferably travels directly through the jack 520 to the plug 510, and is used to activate a locking mechanism (not shown). Alternatively, the signal may be sent directly to the plug 510 via a wireless path. In any event, the signal is received by the plug 510, and in response, the locking members 514 are actuated. In this and other embodiments described herein, the locking mechanisms can be fashioned after known mechanisms.

One particularly useful aspect of the embodiment of Figure 5 is that the chord 540 can be wrapped about a post, chair, or other object. This provides improved protection against theft for computers that have no special parts to which one can attach any sort of lock.

Thus, specific embodiments and applications of a jack protector have been disclosed. It should be apparent, however, to those skilled in the art that many more modifications besides those already described are possible without departing from the inventive concepts herein. The inventive subject matter, therefore, is not to be restricted except in the spirit of the appended claims. Moreover, in interpreting both the specification and the claims, all

terms should be interpreted in the broadest possible manner consistent with the context. In particular, the terms "comprises" and "comprising" should be interpreted as referring to elements, components, or steps in a non-exclusive manner, indicating that they may be present, or utilized, or combined with other elements, components, or steps that are not expressly referenced.

5



## CLAIMS

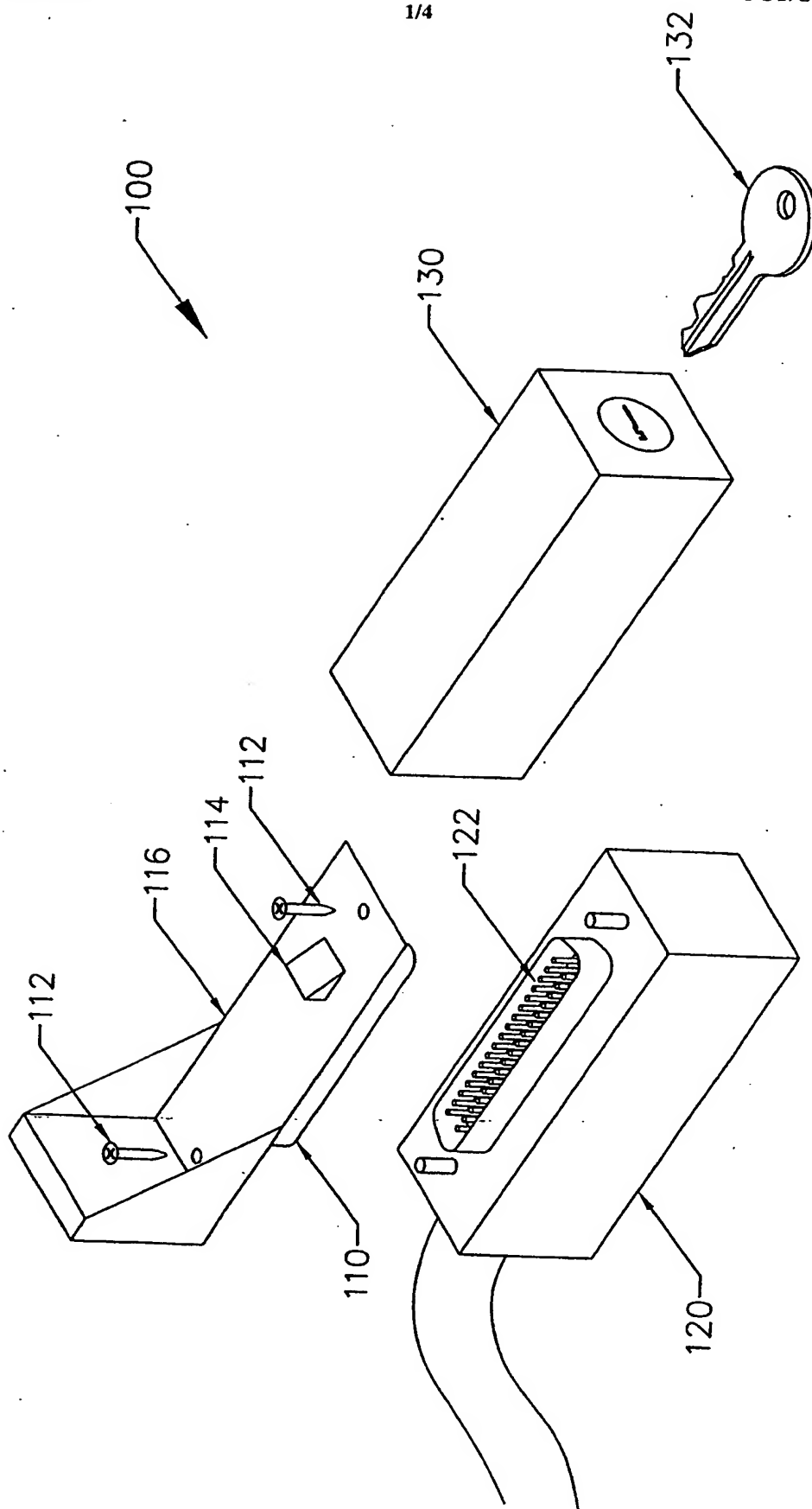
What is claimed is:

1. A locking communications plug, sized and dimensioned to fit within a communications jack, comprising:  
5 a key-receiving portion; and  
a locking member that cooperates with the key-receiving portion to lock the plug within the jack.
2. The locking communications plug of claim 1, wherein the key-receiving portion comprises a hole.
- 10 3. The locking communications plug of claim 1, wherein the key-receiving portion comprises a slot.
4. The locking communications plug of claim 1, wherein the key-receiving portion further comprises a fingerprint sensor.
5. The locking communications plug of claim 1, wherein the key-receiving portion is  
15 mechanically operated.
6. The locking communications plug of claim 1, wherein the key-receiving portion is magnetically operated.
7. The locking communications plug of claim 1, wherein the key-receiving portion is electronically operated.
- 20 8. The locking communications plug of claim 7 further comprising an electronic signal transceiver.
9. The locking communications plug of claim 1, wherein the key-receiving portion further comprises at least one of a hole, a slot, and a fingerprint sensor.
10. The locking communications plug of claim 8, wherein an electronic signal is  
25 communicated from the jack.
11. The locking communications plug of claim 1 further comprising a face portion, wherein the key-receiving portion is located on the face portion.

12. The locking communications plug of claim 1 further comprising a face portion, wherein the key-receiving portion is located on a side other than the face portion.
13. The locking communications plug of claim 1 further comprising a plurality of locking members.
- 5 14. The locking communications plug of claim 1, wherein the jack comprises a lock receiving portion that cooperates with the locking member.
15. The locking communications plug of claim 1, wherein the jack is configured to accept an Ethernet plug.
- 10 16. The locking communications plug of claim 1, wherein the jack comprises an RJ45 modular jack.
17. The locking communications plug of claim 1, wherein the jack is coupled to a computer.
18. The locking communications plug of claim 17, wherein the computer sends a signal to the plug that unlocks the plug.
- 15 19. A method of locking a communications jack comprising:  
providing a locking communications plug having a key-receiving portion coupled to a locking member;  
inserting the locking communications plug into the communications jack; and  
locking the plug within the jack by manipulating the key-receiving portion.
- 20 20. A method of locking a computer comprising:  
locking a communications plug into a communications jack;  
providing a cable coupled to the communications plug; and  
locking the cable to a securing object.

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FIGURE 1 (Prior Art)



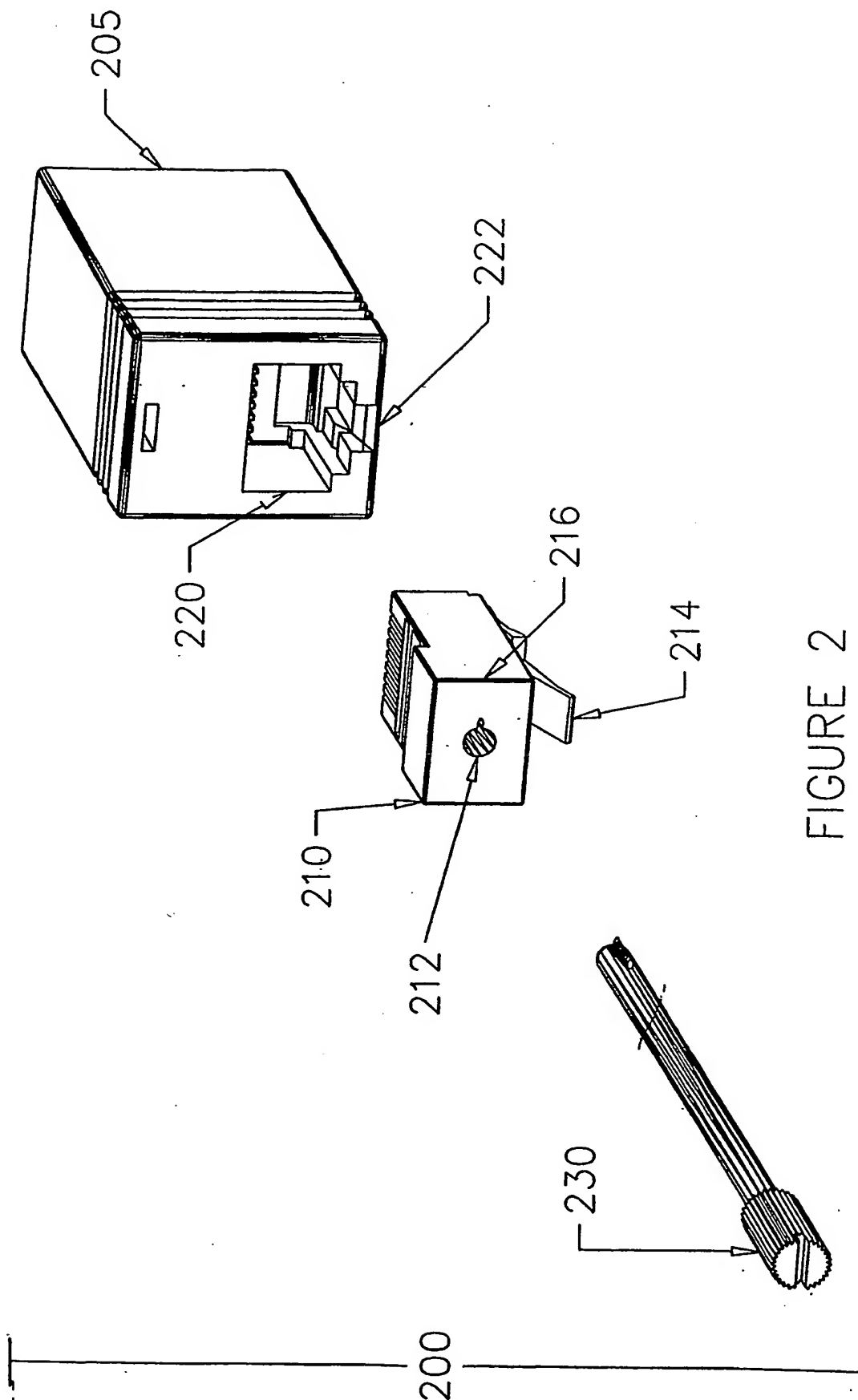


FIGURE 2

FIGURE 3

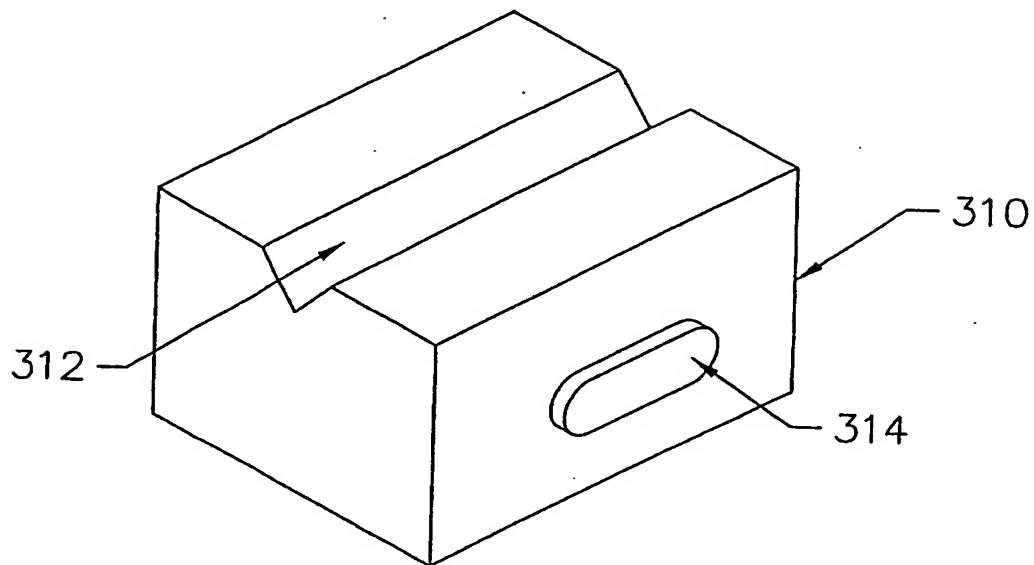
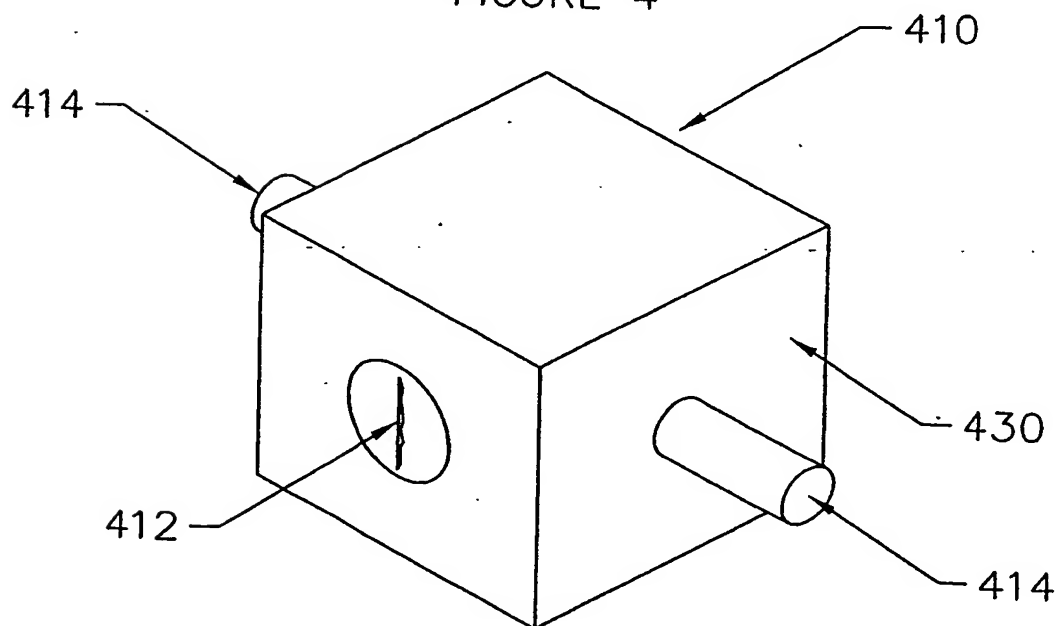


FIGURE 4



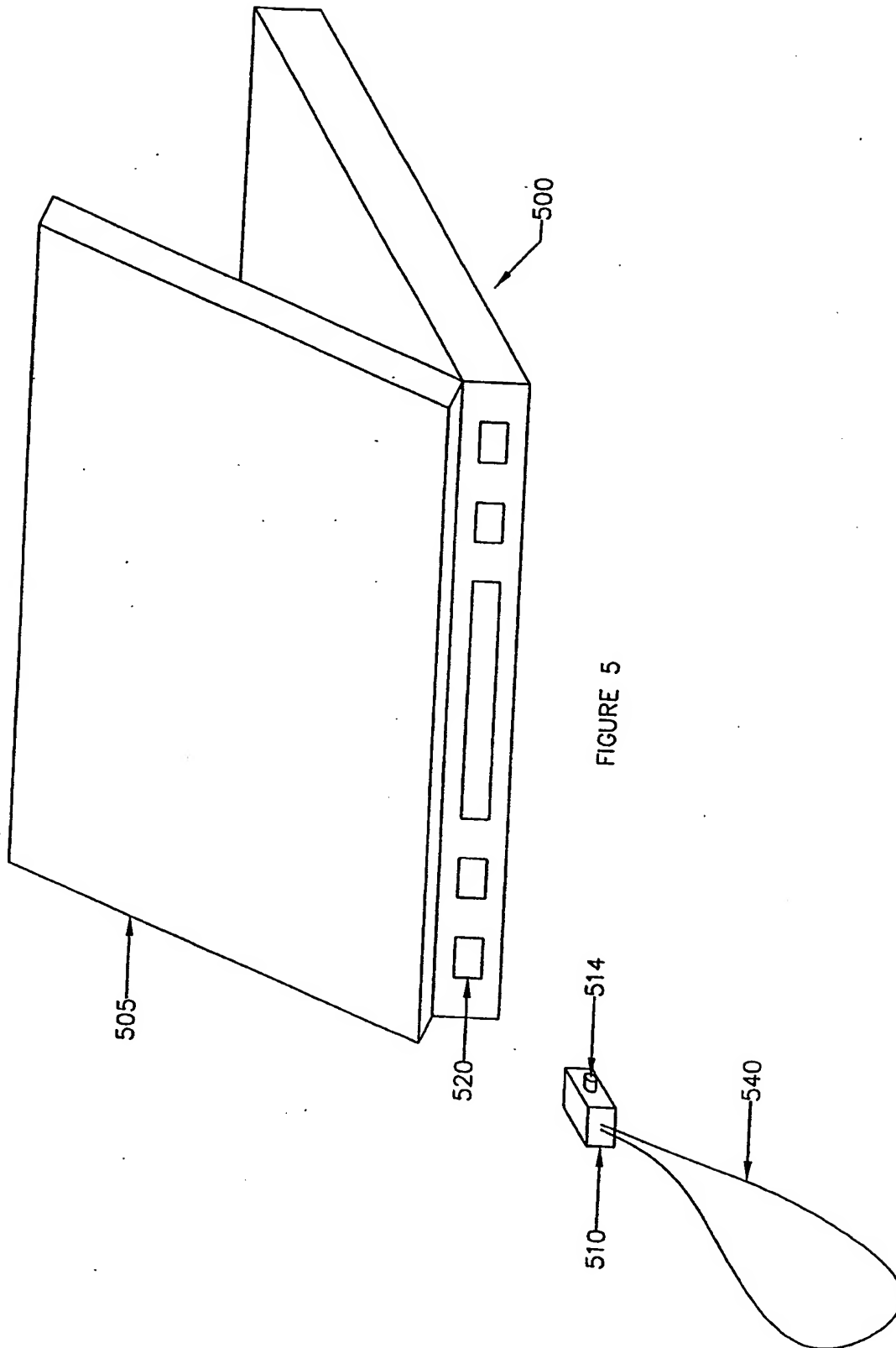


FIGURE 5

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/30606

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H01R 13/44  
US CL : 439/133

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 439/133

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,305,380 A (HILEMAN et al.) 19 April 1994 (19.04.1994), entire document.	1-20
X	US 5,340,324 A (FIELDS et al.) 23 August 1994 (23.08.1994), entire document.	1-20

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

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02 December 2002 (02.12.2002)

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